REMARKS

This is a full and timely response to the Final Office Action sent electronically on January 31, 2008. Upon entry of the foregoing amendments, claims 4, 10 and 13-15 are pending in the application. Claims 4, 10 and 13 have been amended. Claims 1-3, 5-9, 11, 12, 16 and 17 have been canceled. The subject matter of amended claims 4, 10 and 13 can be found in at least FIGs. 1 and 2 and the related detailed description of the originally filed specification. Consequently, no new matter is added to the present application. In light of the foregoing amendments and following remarks, Applicants request reconsideration of the application and pending claims.

Claim Rejections Under 35 USC § 103 – Claims 4, 10, 13-15 and 17

A. Statement of the Rejections

Claims 4 and 10 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over U.S. Patent No. 6,664,556 to Doberenz, hereafter *Doberenz*, in view of U.S. Patent No. 5,016,046 to Nishiyama, hereafter *Nishiyama* and U.S. Patent No. 5,477,326 to Dosmann, hereafter *Dosmann*.

Claims 13-15 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over *Doberenz* in view of *Nishiyama*, *Dosmann* and U.S. Patent No. 5,117,118 to Fukuyama, hereafter *Fukuyama*.

B. Discussion of the Rejections

A *prima facie* case of obviousness is established when the teachings from the prior art itself would appear to have suggested the claimed subject matter to a person of ordinary skill in the art. *In re Rinehart,* 531 F.2d 1048, 1051, 189 USPQ 143, 147 (CCPA 1976). To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable

expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Applicants' independent claims 4, 10 and 13, as amended, comprise features that are not disclosed, taught, or suggested by the prior art.

1. Claim 4

Applicants' independent claim 4, as amended, is directed to a module for converting an optical signal to a digital signal that comprises "a sawtooth generator producing a sawtooth wave, the sawtooth wave having a first segment with a non-varying positive slope and a second segment immediately following and adjacent to the first segment, the second segment having a negative slope, wherein the magnitude of the slope of the second segment is greater than the magnitude of the slope of the first segment."

In contrast with Applicants' claimed module, the proposed combination of *Doberenz* in view of *Nishiyama* and *Dosmann* does not disclose, teach or suggest a module for converting an optical signal that comprises a sawtooth generator that produces the claimed sawtooth wave. Specifically, Applicants' claimed sawtooth generator produces a sawtooth wave having a first segment with a non-varying positive slope and a second segment immediately following and adjacent to the first segment, the second segment having a negative slope, wherein the magnitude of the slope of the second segment is greater than the magnitude of the slope of the first segment. The proposed combination of *Doberenz*, *Nishiyama* and *Dosmann* does not disclose, teach or suggest such a sawtooth generator.

In this regard, *Doberenz* (column 2, lines 44-50) teaches a signal (XY_AB_ON_0) generated by a microcontroller that provides power to LEDs to save power. Output from the LEDs is used in a quadrature phase decoding process to determine movement of a pointing device. As indicated in *Doberenz* FIG. 3, the signal has a 25% duty cycle, which results in the LEDs using 25% of the power that they would if they were on full time. *Doberenz* (FIGs. 3-5) clearly shows embodiments of a signal V_{ref} having a discontinuous positive slope over less than 25% of the period of the signal. That is, the signal V_{ref} is periodic with four distinct segments. In a first segment, the signal V_{ref} has a first positive slope. In a second

segment, the signal V_{ref} has a second positive slope that is significantly greater than the slope of the first segment. In a third segment, corresponding with the signal XY_AB_ON_0, the signal V_{ref} has no slope. In a fourth segment, the signal V_{ref} has a negative slope.

The Office Action (page 4, item 4, ¶ 2, lines 9-13) states that the signal V_{ref} has a first segment with a non-varying positive slope and a second segment adjacent to the first segment, the second segment having a negative slope. The segment of V_{ref} that has a negative slope appears before the segment of V_{ref} having a positive slope. In other words, a second segment having a negative slope appears earlier in time than a first segment having a non-varying positive slope. This interpretation, while supported by one definition of a "first" and a "second," ignores the plain and ordinary definition of the phrases "first segment" and "second segment" when applied in the context of a time-varying signal. A time-varying signal on an oscilloscope, as depicted in *Doberenz* FIG. 3, traverses the display from left to right. When the time-varying signal is periodic, such as V_{ref} depicted in *Doberenz* FIG. 3, a first segment, which can start at any point in the period, appears to the left of an adjacent second segment. Stated another way, a first segment occurs earlier in time than an adjacent second segment.

However, to advance prosecution, Applicants' have amended independent claim 4 to include "a first segment with a non-varying positive slope and a second segment immediately following and adjacent to the first segment, the second segment having a negative slope, wherein the magnitude of the slope of the second segment is greater than the magnitude of the slope of the first segment."

Doberenz, which illustrates a signal having a first segment with a negative slope immediately followed by a second segment with a first positive slope immediately followed by a third segment with a second positive slope that is different from the first positive slope, is in direct contrast with Applicants' claimed sawtooth generator, which produces a sawtooth wave having "a first segment with a non-varying positive slope and a second segment immediately following and adjacent to the first segment, the second segment having a negative slope, wherein the magnitude of the slope of the second segment is greater than the magnitude of the slope of the first segment."

Nishiyama is cited for generating an amplified voltage signal. FIG. 2 of *Nishiyama* shows a sawtooth waveform having first and second segments having slopes of identical magnitude but opposite polarity. The sawtooth wave disclosed by *Nishiyama* is also in direct contrast with Applicants' claimed sawtooth wave. A sawtooth wave with adjacent segments of identical magnitude and opposite polarity does not disclose, teach or suggest Applicants' claimed sawtooth wave, which includes adjacent segments of opposite polarity wherein the magnitude of the slope of the second segment is greater than the magnitude of the first segment. Accordingly, *Nishiyama* does not remedy the failure of *Doberenz* to disclose, teach or suggest Applicants' claimed sawtooth generator.

Dosmann is cited for the use of an optical filter. *Dosmann* is entirely silent regarding a sawtooth generator. Accordingly, *Dosmann* does not remedy the failure of *Doberenz* and *Nishiyama* to disclose, teach or suggest Applicants' claimed sawtooth generator. Accordingly, the proposed combination fails to establish a *prima facie* case of obviousness as to Applicants' amended independent claim 4 and the rejection of claim 4 under 35 U.S.C. § 103(a) should be withdrawn.

2. Claim 10

Applicants' independent claim 10, as amended, is directed to a method that comprises at least the step of "generating a sawtooth wave, the sawtooth wave having a first segment with a non-varying positive slope and a second segment immediately following and adjacent to the first segment, the second segment having a negative slope, wherein the magnitude of the slope of the second segment is greater than the magnitude of the slope of the first segment."

In contrast with Applicants' claimed method, the proposed combination of *Doberenz* in view of *Nishiyama* and *Dosmann* does not disclose, teach or suggest the step of generating a sawtooth wave, the sawtooth wave having a first segment with a non-varying positive slope and a second segment immediately following and adjacent to the first segment, the second segment having a negative slope, wherein the magnitude of the slope of the second segment is greater than the magnitude of the slope of the first segment.

Doberenz (column 2, lines 44-50) teaches a signal (XY_AB_ON_0) generated by a microcontroller that provides power to LEDs to save power. Output from the LEDs is used in a quadrature phase decoding process to determine movement of a pointing device. As indicated in *Doberenz* FIG. 3, the signal has a 25% duty cycle, which results in the LEDs using 25% of the power that they would if they were on full time. *Doberenz* (FIGs. 3-5) clearly shows embodiments of the signal V_{ref} with a discontinuous positive slope over less than 25% of the period of the signal. That is, the signal V_{ref} is periodic with four distinct segments. In a first segment, the signal V_{ref} has a first positive slope. In a second segment, the signal V_{ref} has a second positive slope that is significantly greater than the slope of the first segment. In a third segment, corresponding with the signal XY_AB_ON_0, the signal V_{ref} has no slope. In a fourth segment, the signal V_{ref} has a negative slope.

In this regard, the Office Action (page 4, item 4, ¶ 2, lines 9-13) states that the signal V_{ref} has a first segment with a non-varying positive slope and a second segment adjacent to the first segment, the second segment having a negative slope. The segment of V_{ref} that has a negative slope appears before the segment of V_{ref} having a positive slope. In other words, a second segment having a negative slope appears earlier in time than a first segment having a non-varying positive slope. This interpretation, while supported by one definition of a "first" and a "second," ignores the plain and ordinary definition of the phrases "first segment" and "second segment" when applied in the context of a time-varying signal. A time-varying signal on an oscilloscope, as depicted in *Doberenz* FIG. 3, traverses the display from left to right. When the time-varying signal is periodic, such as V_{ref} depicted in *Doberenz* FIG. 3, a first segment, which can start at any point in the period, appears to the left of an adjacent second segment. Stated another way, a first segment occurs earlier in time than an adjacent second segment.

However, to advance prosecution, Applicants' have amended independent claim 10 to include the step of "generating a sawtooth wave, the sawtooth wave having a first segment with a non-varying positive slope and a second segment immediately following and adjacent to the first segment, the second segment having a negative slope, wherein the magnitude of the slope of the second segment is greater than the magnitude of the slope of the first segment."

Doberenz, which illustrates a signal having a first segment with a negative slope immediately followed by a second segment with a first positive slope immediately followed by a third segment with a second positive slope that is different from the first positive slope, is in direct contrast with Applicants' claimed method, which comprises the step of "generating a sawtooth wave, the sawtooth wave having a first segment with a non-varying positive slope and a second segment immediately following and adjacent to the first segment, the second segment having a negative slope, wherein the magnitude of the slope of the second segment is greater than the magnitude of the slope of the first segment."

Nishiyama is cited for generating an amplified voltage signal. FIG. 2 of *Nishiyama* shows a sawtooth waveform having first and second segments having slopes of identical magnitude but opposite polarity. The sawtooth wave disclosed by *Nishiyama* is also in direct contrast with Applicants' claimed method. A sawtooth wave with adjacent segments of identical magnitude and opposite polarity does not disclose, teach or suggest Applicants' claimed method, which includes generating a sawtooth wave having adjacent segments of opposite polarity "wherein the magnitude of the slope of the second segment is greater than the magnitude of the first segment." Accordingly, *Nishiyama* does not remedy the failure of *Doberenz* to disclose, teach or suggest Applicants' claimed step of generating a sawtooth wave.

Dosmann is cited for the use of an optical filter. *Dosmann* is entirely silent regarding a sawtooth generator. Accordingly, *Dosmann* does not remedy the failure of *Doberenz* and *Nishiyama* to disclose, teach or suggest Applicants' claimed step of generating a sawtooth wave. Accordingly, the proposed combination fails to establish a *prima facie* case of obviousness as to Applicants' amended independent claim 10 and the rejection of claim 10 under 35 U.S.C. § 103(a) should be withdrawn.

3. Claims 13 - 15

Applicants' independent claim 13, as amended, is directed to an apparatus that comprises at least "a sawtooth generator configured to produce a sawtooth wave responsive to a synchronization signal provided via the synchronization pin, the sawtooth wave having a first segment with a non-varying positive slope and a second segment immediately following and adjacent to the first segment, the second segment

having a negative slope, wherein the magnitude of the slope of the second segment is greater than the magnitude of the slope of the first segment."

In contrast with Applicants' claimed apparatus, the proposed combination of *Doberenz* in view of *Nishiyama*, *Dosmann* and *Fukuyama* does not disclose, teach or suggest a sawtooth generator configured to produce a sawtooth wave responsive to a synchronization signal provided via the synchronization pin, the sawtooth wave having a first segment with a non-varying positive slope and a second segment immediately following and adjacent to the first segment, the second segment having a negative slope, wherein the magnitude of the slope of the second segment is greater than the magnitude of the slope of the first segment.

Doberenz (column 2, lines 44-50) teaches a signal (XY_AB_ON_0) generated by a microcontroller that provides power to LEDs to save power. Output from the LEDs is used in a quadrature phase decoding process to determine movement of a pointing device. As indicated in *Doberenz* FIG. 3, the signal has a 25% duty cycle, which results in the LEDs using 25% of the power that they would if they were on full time. *Doberenz* (FIGs. 3-5) clearly shows embodiments of the signal V_{ref} with a discontinuous positive slope over less than 25% of the period of the signal. That is, the signal V_{ref} is periodic with four distinct segments. In a first segment, the signal V_{ref} has a first positive slope. In a second segment, the signal V_{ref} has a second positive slope that is significantly greater than the slope of the first segment. In a third segment, corresponding with the signal XY_AB_ON_0, the signal V_{ref} has no slope. In a fourth segment, the signal V_{ref} has a negative slope.

In this regard, the Office Action (page 4, item 4, ¶ 2, lines 9-13) states that the signal V_{ref} has a first segment with a non-varying positive slope and a second segment adjacent to the first segment, the second segment having a negative slope. The segment of V_{ref} that has a negative slope appears before the segment of V_{ref} having a positive slope. In other words, a second segment having a negative slope appears earlier in time than a first segment having a non-varying positive slope. This interpretation, while supported by one definition of a "first" and a "second," ignores the plain and ordinary definition of the phrases "first segment" and "second segment" when applied in the context of a time-varying signal. A time-varying signal on an oscilloscope, as depicted in *Doberenz* FIG. 3, traverses the display from left to right.

When the time-varying signal is periodic, such as V_{ref} depicted in *Doberenz* FIG. 3, a first segment, which can start at any point in the period, appears to the left of an adjacent second segment. Stated another way, a first segment occurs earlier in time than an adjacent second segment.

However, to advance prosecution, Applicants' have amended independent claim 13 to include "a sawtooth generator configured to produce a sawtooth wave responsive to a synchronization signal provided via the synchronization pin, the sawtooth wave having a first segment with a non-varying positive slope and a second segment immediately following and adjacent to the first segment, the second segment having a negative slope, wherein the magnitude of the slope of the second segment is greater than the magnitude of the slope of the first segment."

Doberenz is in direct contrast with Applicants' claimed apparatus, which includes a sawtooth generator configured to produced a sawtooth wave "responsive to a synchronization signal provided via the synchronization pin, the sawtooth wave having a first segment with a non-varying positive slope and a second segment immediately following and adjacent to the first segment, the second segment having a negative slope, wherein the magnitude of the slope of the second segment is greater than the magnitude of the slope of the first segment."

Nishiyama is cited for generating an amplified voltage signal. FIG. 2 of *Nishiyama* shows a sawtooth waveform having first and second segments having slopes of identical magnitude but opposite polarity. The sawtooth wave disclosed by *Nishiyama* is also in direct contrast with Applicants' claimed sawtooth wave. A sawtooth wave with adjacent segments of identical magnitude and opposite polarity does not disclose, teach or suggest Applicants' claimed sawtooth wave, which includes adjacent segments of opposite polarity "wherein the magnitude of the slope of the second segment is greater than the magnitude of the first segment." Accordingly, *Nishiyama* does not remedy the failure of *Doberenz* to disclose, teach or suggest Applicants' claimed sawtooth generator.

Dosmann is cited for the use of an optical filter. *Dosmann* is entirely silent regarding a sawtooth generator. Accordingly, *Dosmann* does not remedy the failure of *Doberenz* and *Nishiyama* to disclose, teach or suggest Applicants' claimed sawtooth generator.

Fukuyama is cited for forming circuit elements on an integrated circuit. *Fukuyama* is entirely silent regarding a sawtooth generator. Accordingly, *Fukuyama* does not remedy the failure of *Doberenz*, *Nishiyama* and *Dosmann* to disclose, teach or suggest Applicants' claimed sawtooth generator. Accordingly, the proposed combination fails to establish a *prima facie* case of obviousness as to Applicants' amended independent claim 13 and the rejection of claim 13 under 35 U.S.C. § 103(a) should be withdrawn.

For at least the reason that claims 14 and 15 depend directly or indirectly from claim 13 and include all the features of independent claim 13, the rejection of claims 14 and 15 under 35 U.S.C. § 103(a) should also be withdrawn. *In re Fine,* 837 F.2d 1071, 5 USPQ 2d 1596, 1598 (Fed. Cir. 1998).

CONCLUSION

For at least the reasons set forth above, Applicants respectfully submit that pending claims 4, 10 and 13-15 are allowable over the cited art of record and the present application is in condition for allowance. Accordingly, a Notice of Allowance is respectfully solicited. Should the Examiner have any comments regarding the Applicants' response, Applicants request that the Examiner telephone Applicants' undersigned attorney.

Respectfully submitted,

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